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FURTHER OBSERVATIONS

ON

THE WAXY OR AMYLOID FORM

OF

BRIGHT'S DISEASE.

BY

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IN February 1861, I published in this Journal certain views as to the symptoms which accompany the waxy or amyloid degeneration of the kidney, one of the forms of Bright's disease: symptoms which I conceived to be so distinct and constant as to render it easy for us to distinguish during life between this and other forms of renal affection. In this paper I propose to indicate the results of my observation of that disease since the period of my former communication, and the conclusions at which I have arrived. Nearly all the cases have been observed in the Royal Infirmary, and I beg to acknowledge my obligation to the physicians who have kindly permitted me to publish them.

The description which I then gave was the following:—"An individual who has long suffered from wasting disease, such as scrofula, caries, necrosis, or syphilis, or who, though without palpable disease, is of a feeble constitution, feels an increasing weakness, and begins to pass large quantities of urine, and to drink largely. He is, contrary to his usual custom, obliged to rise repeatedly during the night to make water, and on each occasion passes a considerable quantity. The amount of urine varies from 50 to upwards of 200 oz. daily, always bearing a relation to the amount of fluid drunk, generally nearly equalling it in amount, or sometimes even exceeding it. The feet and ankles become oedematous after a hard day's work, but return to their natural condition during the night's repose. In many cases there is observed a hardness and swelling in the hepatic and splenic regions, dependent on an increase of bulk of the liver and spleen. The patient feels a constant lassitude and unfitness for exertion. His urine gradually becomes albuminous, and a few waxy or hyaline tubecasts are to be found in the very scanty sediment which it throws down. It is of low specific gravity—1005 to 1015. The blood presents some peculiarities microscopically: the white corpuscles being somewhat increased in number, and the red presenting a flabby appearance, with a marked tendency to tail,—that is to say, instead of forming into



rouleaux, like healthy corpuscles, they become stretched out into long, spindle-shaped bodies. The blood changes I have observed only when the degeneration affected the lymphatic or blood glands. The patient may continue in this state for months, or even years—may, indeed, undergo a temporary improvement—the liver and spleen becoming diminished in bulk, and the blood resuming a more healthy character; but, sooner or later, for the most part ascites or general dropsy gradually supervene, accompanied frequently by diarrhoea, which is at times found quite uncontrollable. The urine, now very albuminous, diminishes in quantity, so as at times to be almost or altogether suppressed; effusions into the serous cavities or severe bronchitis ensues; the patient becomes exhausted and sinks, or drowsiness comes on, and the disease terminates amid coma and convulsions.”

Further experience has confirmed the opinions then expressed, and in all cases in which an autopsy revealed the lesion, and in which I had the opportunity of carefully examining the patients, I ascertained the existence of the symptoms which I have indicated. In support of my views I adduced in my former communication twenty cases, in nine of which the existence of the lesion was ascertained by post-mortem inspection. In the present paper I shall complete the history of three of these, continue that of another to the present time, and give a summary of fourteen other cases, in several of which autopsies have been made.

CASE I.—A. M., shoemaker, æt. 33. His case was minutely described in the previous paper. Of a syphilitic constitution, he was, about four years ago, under treatment in the Infirmary for enlargement of the liver and spleen, with slight leucocythemia. He had no dropsy, but made a large quantity of water, of low specific gravity. From his history and the urinary symptoms, I ventured to anticipate the appearance of albumen in the urine. It was carefully tested, day by day, and, after a while, a trace of albumen appeared; this gradually increased; and afterwards fine hyaline tubecasts were occasionally seen in the urine. These symptoms had lasted for about nine months at the date of my former publication, and since that time they have steadily continued. The following notes were taken at the dates mentioned:—

*4th February* 1861.—The liver and spleen have further diminished in size. His appearance is somewhat less cachectic. For some days he has had a pain in the neighbourhood of the umbilicus, and along the margin of the liver, aggravated on movement or on pressure, and after eating. The stools are of a dark colour, and contain some bright red blood. He has no piles. The amount of urine continues high, about 120 oz. daily. It is albuminous.

*8th October* 1861.—The patient again presented himself; his cachectic appearance is increased; he complains of a severe pain in the lumbar region, and along the spermatic cords. His renal symptoms continue unchanged, and the liver is still distinctly enlarged.

Since that time he has frequently presented himself at the New Town Dispensary and elsewhere; has repeatedly been an inmate of the Royal Infirmary; has been able occasionally to work at his occupation of shoemaking, and has of late acted pretty constantly as cook to the Mid-Lothian Militia stationed at Dalkeith. The last note I have taken of his case was on 21st March 1864. He continues to make large quantities of water daily, usually upwards of 120 oz. It is still albuminous, but no tubecasts have been discovered for some time. The hepatic dulness is diminished to about six inches; the organ is still painful on pressure.



He has no nausea, and his bowels are regular; but on several occasions lately he has had intense diarrhoea, sometimes bloody, and has vomited blood-coloured matters. His complexion is even darker than before, and his eyelids are more œdematous than I have ever observed them. From some observations made for me by Mr Taylor, it appears that his temperature is somewhat lower than natural.

CASE II.—E. H., a washerwoman, æt. 43. This case was reported in the previous paper. She had been of intemperate habits, but was not known to have had syphilis; she had long-continued polyuria; her urine was of low specific gravity, very albuminous, and contained hyaline casts. She had also a lesion of the aortic and mitral valves. She was dismissed from the Royal Infirmary in May 1860. In November of that year I found that her symptoms were not materially changed. She continued to make from 180 to 210 oz. of urine daily. It was of low specific gravity; it contained albumen and casts. There was slight œdema; the diarrhoea less intense than formerly; the cardiac symptoms unchanged. Throughout the years 1861-62-63 I saw her frequently in St Cuthbert's Poorhouse, in the Royal Infirmary, in the dispensary, and elsewhere. Her renal symptoms were little altered. A distinct aneurismal dilatation had gradually developed itself; and a certain amount of œdema of the limbs occasionally appeared. When she was last in the Infirmary I had the opportunity, by the kindness of Dr Laycock, of making the following notes:—

*20th April 1864.*—The skin is pale; conjunctiva clear, slightly œdematous. There is a good deal of congestion over the malar bones. The legs are œdematous; the tongue is clean. She has some difficulty in swallowing, particularly solids. Sickness follows eating, and she occasionally vomits. Vertical hepatic dulness in the right mamillary line measures about five inches. The bowels are loose. She complains of pain in the left hypochondrium. She has occasional giddiness, and sleeps badly. Her pupils are equal. There is a double blowing murmur at the apex of the heart, and at the base of the neck there is a very distinct aneurism. The urine is copious, exceeding on an average 100 oz. daily. Its specific gravity is about 1008. It is of an acid reaction, contains much albumen, some phosphates, and epithelium and granular casts.

*5th June.*—Her dyspnoea, dropsy, and general debility gradually increased, until the 5th of June 1864, when she died.

*Autopsy, 58 hours after death.*—The body was well nourished. The right pleural cavity contained about half an ounce of clear serum. The left pleura was obliterated by old adhesions. Both lungs were congested and œdematous; in several parts there were small dense nodules, whose nature was not determined. The pericardium contained a little fluid, and some lymph was deposited on both its layers. The heart was enlarged, weighed  $8\frac{3}{4}$  ounces; it was fatty. The margins of the mitral valve were thickened. The aortic valves incompetent. The aorta was dilated, its coats sclerotic and atheromatous, and contained some calcareous plates. There were distinct dilatations in the course of the innominate and subclavian arteries. The liver weighed 3 lbs.  $3\frac{1}{2}$  ounces, was soft and fatty, and presented no reaction with iodine. Spleen weighed  $3\frac{3}{4}$  ounces, and was not waxy. The right kidney was small, weighing 4 ounces; the capsule was adherent; the surface granular; the cortical substance was atrophied. The left weighed 6 ounces, was distinctly waxy and fatty, less atrophied; the capsule was also adherent. The Malpighian bodies, as well as the arteries of the cortex and of the cones, were in a state of waxy degeneration.

CASE III.—E. B., a bricklayer's labourer, aged 33. His case was recorded in the previous paper. Of a syphilitic constitution, he made a large quantity of water, upwards of one hundred ounces daily, highly albuminous, of low specific gravity, and containing a few waxy casts. He was dismissed from the Infirmary on the 30th of April 1860. The following notes indicate his after history:—

*7th April 1861.*—His general appearance is better than it had been last year. He states that he is quite well, but that the daily amount of urine has not diminished. It is highly albuminous, of low specific gravity, and contains casts.



His tongue is clean; his appetite good; his bowels are moved twice a-day. The liver is much enlarged, measures eight inches vertically, and extends considerably across the epigastrium to the left side. The spleen is also enlarged. The blood contains an excess of white corpuscles. Expiration is harsh and prolonged at the apices of both lungs. The heart-sounds are altered in tone, but not of a blowing character.

*13th August 1862.*—The patient again presented himself. He is more emaciated. States that from increasing debility he has been unable to work for a month past. He still makes large quantities of urine, which is albuminous, but not so intensely as before. It deposits a sediment containing hyaline tubercasts, with oil-granules here and there arranged in groups, as if resulting from disintegration of cells. There has been no dropsy of late. The liver, though still enlarged, is decidedly diminished since last report. He complains much of his breathing.

*22d September 1863.*—He complains much of difficulty of breathing, and of cough and headache when he attempts to stoop; he has also dropsy; and from all these symptoms feels himself unable to follow his usual work. The amount of urine is still large. He is obliged to rise three or four times every night in order to micturate. The urine is albuminous, and contains casts. He entered the Infirmary, and under the care of Dr Sanders improved, so as to be able to go out, and for a time pursue his usual avocations; but in November he again presented himself, complaining of a further aggravation of his symptoms. He died soon after admission, in November 1863, and his body presented the following post-mortem appearances:—

The body was somewhat emaciated. The heart was enlarged; its left side was much hypertrophied. The aortic valves were competent; but at the base of one of the segments there was a calcareous mass. The aorta was very atheromatous. The lungs were very oedematous; the bronchi were congested and full of mucus. The liver was about the natural size. On its surface were a number of nodules and cicatrices. At the bottom of some of the latter, nodules of a pale colour were visible. On section, numerous nodules were found scattered throughout the organ; they were pale, dense, and had an appearance exactly resembling bees-wax; their structure was much denser than that of the surrounding tissue. In some nodules there were streaks of fibrous tissue throughout the substance and round the margin, and the greater the proportion of that tissue the deeper were the cicatrices. In the nodules elevated above the surface there were no such streaks, or very few. In those situated at the bottom of deep cicatrices, the fibrous element was abundant, or even in excess of the glandular. On applying iodine to these masses, the whole of the waxy-looking material assumed the brownish red colour characteristic of the amyloid degeneration, but the fibrous streaks simply assumed a yellow tinge. Microscopically, the masses were found to present exactly the characters of ordinary amyloid hepatic cells. They were composed entirely of these cells, enlarged, transparent, and finely granular. In some parts the cellular elements were broken down, and a finely granular material containing some oil-globules was present. The fibrous tissue in the masses presented the ordinary characters of connective-tissue; and where it was most abundant the cells were most atrophied. Throughout the rest of the organ the cells were little affected with the waxy degeneration, but some of the small vessels showed it distinctly. The fibrous bands were seen passing into the tissues round the cicatrices and nodules. The capsule of Glisson was thickened in some parts, and on applying the iodine externally to the cicatrices no reaction was observed. The spleen contained one cicatrized mass, which presented no reaction with iodine. The kidneys were somewhat contracted in the cortical substance, and presented a very well-marked instance of the amyloid degeneration of the vessels and Malpighian bodies. There was some degree of amyloid degeneration of the villi of the small intestine; the bowels were otherwise natural. The prepuce presented traces of the old syphilis, and it had been previously ascertained that there were numerous syphilitic ulcerations in the throat.



CASE IV.—J. M., brushmaker, aged 33. His case was recorded in the previous paper. Of a syphilitic constitution, he exhibited distinct traces of the cachexia. While under observation, he passed from 60 to 80 ounces of urine daily, of low specific gravity, albuminous, with hyaline tubecasts, and containing here and there a fatty cell. He was dismissed from the Infirmary about the middle of August 1860, and for a year afterwards I saw him occasionally. He always retained the cachectic appearance, and continued to make large quantities of urine. Until the end of October 1861 he was going about attending to his work, but suddenly his urine diminished in quantity, and became bloody, and on the following day he was seized with convulsions. These continued for some days. He was removed to the Infirmary, where he died on 5th November. In the intervals of his fits he was conscious, though unable to speak.

On post-mortem examination there were found syphilitic necrosis of the cranial bones, and other evidences of constitutional syphilis. The liver was large and distinctly waxy; the spleen presented the degeneration in a slight degree; the kidneys were somewhat contracted, firm, and presented an exquisite specimen of the amyloid degeneration of the vessels and Malpighian bodies.

In these four cases we have a continuation of the history of this disease in cases previously published. The following cases are new.

CASE V.—J. M., labourer, aged 18, admitted to the Royal Infirmary, under the care of Dr Bennett, 13th September 1861. He stated that six weeks previous to admission he caught cold, had cough, with frothy expectoration, and soon afterwards that he noticed that he was passing more water than usual. Had frequently to get up during the night to empty his bladder. About a month later his feet began to swell.

On admission, the heart-sounds were normal. There were the ordinary signs and symptoms of bronchitis. There was no dropsy. The skin was cool and moist. There was lumbar pain. The urine was pale, very copious; of specific gravity 1012; highly albuminous; contained granular and fatty tubecasts. He had great thirst. The bowels were constipated.

The amount of urine varied between 3d and 15th October from 75 to 122 ounces. Only on three days was it below 100 ounces. Throughout that month the quantity continued large, though on some days it was considerably diminished, and it was almost invariably in excess of the fluids drunk. The pulmonary symptoms rapidly increased in severity. The upper half of one lung became distinctly dull, while the bronchial affection increased. There was some degree of dropsy. The blood contained fully double the natural proportions of white corpuscles.

During November and December the daily quantity of urine gradually diminished. The albumen did not diminish. The casts became less fatty. General dropsy set in. This symptom became so distressing, that, on 10th June, acupuncture was employed for the relief of the dropsy. At the same time the pulmonary symptoms steadily increased, and the patient died on 13th January.

On post-mortem examination, there was general dropsy of cellular tissue and serous cavities. The heart was somewhat hypertrophied. Both pleuræ were adherent. The lungs were oedematous, and contained distinct traces of tubercle. The kidney capsule was adherent; the surface granular. The cortical substance somewhat atrophied. Many of the tubules were filled with finely granular fatty matter. The spleen was firm; the intestines were oedematous. On adding a solution of iodine, many of the arteries and Malpighian bodies assumed a reddish orange colour, and on the further addition of dilute sulphuric acid became reddish purple. There was slight waxy degeneration of the liver, spleen, and of portions of the intestines.

CASE VI.—I. C., æt. 16, a servant, admitted to Ward XI., 27th February 1861, under the care of Dr Laycock. She had in the year 1860 been affected with phthisis pulmonalis, and had somewhat improved. After I had lost sight of her she observed that she had occasion to get up several times every night to make water, and that each time she made a large quantity. About January she was exposed to cold and wet, and noticed that her feet and ankles swelled,



and her urine became diminished in quantity. She had also some lumbar pain and diarrhoea, and on this account entered the Infirmary.

On her admission I had an opportunity of examining her, and found the signs of phthisis considerably developed. She looked anæmic. Her appetite was bad. She frequently vomited. Her bowels were very loose. The amount of her urine could not be determined on account of the diarrhoea. It was highly albuminous; specific gravity 1030. Contained hyaline casts. The liver and spleen were enlarged. The blood contained an unusual number of white corpuscles. There was considerable general dropsy, and she died a few days after admission.

*Autopsy.*—The lungs were found to contain large quantities of tubercle, and on the intestines there were numerous irregular tubercular ulcers. The liver, kidneys, and spleen were found to be large and waxy. The Malpighian bodies and small arteries of the kidneys assumed a reddish purple colour on the addition of iodine and sulphuric acid. Many of the hepatic cells and the Malpighian bodies of the spleen presented the same reaction.

CASE VII.—J. C., æt. 21, a miner, was admitted, under the care of Dr Haldane, into the Royal Infirmary, in January 1864. He was of stunted growth. He had worked underground since he was seven years of age. At the age of sixteen he had pneumonia, and ever afterwards was breathless and liable to colds. He used to notice that he had to rise during the night to make water, and was often interrupted at his work from the same cause. Two months before admission he was exposed to cold and wet, and became dropsical. His urine diminished in quantity; its specific gravity was 1015, albuminous, and contained some casts. He died exhausted, partly by the renal and partly by pulmonary affection.

*Autopsy*, forty-two hours after death. The body was greatly emaciated. The lungs contained tubercle and carbonaceous matter. There were some vomicæ towards the apices. The heart was dilated. The liver normal. The spleen presented amyloid degeneration of the Malpighian bodies. The kidneys were of good size; many of the tubercles filled with fatty granules and exudation. The small arteries and Malpighian bodies presented a translucent appearance, and assumed a blue colour on the addition of iodine and sulphuric acid. The villi of the small intestine also presented this degeneration.

CASE VIII.—J. N., æt. 32, Ward VII., under the care of Dr Haldane, in the Royal Infirmary. Examined 25th January 1864.

Fourteen years ago, when the patient was eighteen years of age, he had chancre, and other signs of constitutional syphilis. These syphilitic symptoms continued to recur at intervals for a long time. Six years ago, having been exposed to cold and wet, he had what seems from his description to have been an attack of acute renal dropsy. From this he recovered. Has since had pains in the tibia, worst at night; in the epigastrium, and in the region of the kidneys. Towards the end of last year he observed that he was obliged to get up several times every night and make water, and that on each occasion he made a considerable quantity. He estimated the amount to be about 160 ounces. This has continued to the present time.

On admission, his liver was found enlarged. In the line of the nipple it measured 7 inches vertically; in the middle line  $5\frac{3}{4}$ . The spleen was also enlarged; measured  $4\frac{1}{2}$  inches vertically, and 6 inches across. The blood contained an excess of white corpuscles, and the red did not form rouleaux, but irregular clumps; they had a tendency to tail. The tongue was loaded in the centre, furred at the edges. The appetite was good, but some sickness and vomiting followed every meal. The bowels were natural. The heart sounds were normal. Pulse about 92 per minute. There was some crepitation heard at the bases of both lungs, and at the apex of the right. There was pain on pressure over the kidneys. The urine varied in amount, from 90 to 130 or 150 oz.; was pale, of low specific gravity, contained much albumen, but no tubecasts could be found. There was also enlargement of the right testicle, and dropsy of the left tunica vaginalis. There were numerous



small periosteal swellings over both tibiæ. There was also a tendency to swelling of the feet in the evening, but not to any great extent. There were also occasional attacks of epistaxis, and of hæmorrhage from the bowels, and a purpuric condition of the skin of the lower extremities. The gums were also swollen and spongy.

*12th April.*—Under a general tonic treatment, the patient has in so far improved, but he continues to present the symptoms characteristic of waxy degeneration of the kidneys, liver, and spleen. He was dismissed relieved.

CASE IX.—A. M., a seaman, æt. 34, admitted to Paton's ward, under the care of Dr Laycock, 6th February 1864. In his profession of seaman he has travelled much in foreign countries. Was never an intemperate man, though he sometimes took a week's debauch on getting ashore. He never had syphilis, but once, several years ago, had some ulcers in the throat. Four years ago, while in India, he was ill of inflammation of the liver, at least an inflammation at the hepatic region, unaccompanied by jaundice. Since that time he has been working on the Burntisland ferry steamer, and was much exposed to cold and wet. He noticed that his feet tended to swell slightly, particularly towards evening, and about nine months ago (last August) he observed that he was compelled to leave his bed several times every night in order to micturate, and that each time he made a considerable quantity. This was before the dropsy began. Last October he caught cold, had cough and expectoration, and about Christmas his feet and legs swelled considerably, and he noticed that his abdomen was remarkably prominent and hard. These symptoms increasing, he was unable to work, and was admitted to the Infirmary 6th February.

On admission, he was a stout-built man, somewhat pale, but with numerous distended capillaries over the malar bones. He had an incipient arcus senilis. His breath was short; but the respiratory and circulatory sounds were normal. The gastro-intestinal system was normal; but the liver was much enlarged, measuring about eight inches vertically, and extending over on the epigastrium. The spleen also seemed enlarged. The blood contained a slight excess of white corpuscles, and the red had a somewhat flabby appearance. There was some degree of ascites. There was no lumbar pain even on pressure. The daily quantity of urine was about 120 ounces. Its specific gravity was about 1013; its colour pale amber; its reaction acid; it contained a good deal of albumen, and a few finely granular and hyaline tubecasts.

*12th April.*—Since he has been under treatment, his general health has improved. The dropsy has for the most part disappeared, but the characters of the urine have remained unaltered. He was dismissed relieved.

CASE X.—E. D., æt. 35, a bookbinder, first examined 7th March 1861. This patient had contracted syphilis fifteen years before he came under my observation. Since that time he has suffered from various constitutional symptoms, eruptions, nodes, tic, etc. At the time he was under my care he had a pustular syphilitic eruption on his face. During the year preceding he had observed that he was obliged to get out of bed several times each night in order to make water, and that he made a considerable quantity on each occasion. At the same time he observed that his feet were swollen at night, but the swelling had subsided in the morning. The urine varied in amount from 55 to 150 oz. per diem. It was highly albuminous, and contained a few hyaline casts. This large quantity of urine continued to be passed daily for several months during which he was under observation. The liver and spleen were natural.

The patient having left Edinburgh, I lost sight of him; but the symptoms of his case were so distinctly those of amyloid degeneration, that I have no hesitation in including him in this category.

CASE XI.—J. M., æt. 36, a labourer, was admitted to the Royal Infirmary, under the care of Dr Haldane, in April 1864. He had led an irregular life, had been a soldier, and was believed by his friends to have been the subject of syphilis. About two years before admission he was observed to make large quantities of water, and at a time at which he exhibited no other symptoms of



illness, his frequent micturition had become a standing joke in his family circle. About six months before admission he became dropsical, and excessively intemperate. About the middle of April he was exposed to cold and wet, and was seized with rigors, following upon which was a severe pneumonia, from which he died.

*Autopsy.*—His body was examined eighteen hours after death. The heart was normal. The right lung was pneumonic throughout, some portions of it in a state of grey hepatization, others less advanced. The left lung was adherent to the diaphragm at the base, and in its lower lobe contained a cicatrix. The liver weighed 5 lbs. 10 ounces, was waxy and fatty. Spleen waxy, weighed upwards of 1 lb. The kidneys were both enlarged, the right weighed 11 ounces, and the left 9 ounces. Both of them presented exquisite examples of the amyloid degeneration of the vessels and Malpighian tufts. There was also marked fatty degeneration of the epithelium in the tubules, and while the whole organs were increased in size, the cortical substance was relatively diminished. The surface was granular. There was abundance of fat throughout the body, particularly in the omentum and mesentery. The intestines tore off from the mesentery with the greatest ease. Its vessels were found to be in a state of amyloid degeneration. The villi and minute arteries of the small intestine presented exquisite examples of the degeneration. Brain congested. Serous effusion on its surface and under its membrane.

CASE XII.—M. R., æt. 44, was admitted to the Royal Infirmary, under the care of Dr Sanders, 26th May 1864. She was a field-worker, and latterly a washerwoman; had generally been healthy, but for two months before admission had been out of health; her breathing being embarrassed, her appetite poor, bowels loose, urine copious. A fortnight before admission dropsy had appeared. The quantity of urine was upwards of 80 ounces daily; it was pale, of specific gravity 1011; contained albumen, and no tubecasts. In the hospital these symptoms continued, and she died exhausted on 10th June.

*Autopsy*, seventy-two hours after death. The body was well nourished. The heart was natural. Aortic valves somewhat thickened. Arch of the aorta was very atheromatous, and contained some calcareous plates. The lungs were œdematous. Near the root of the left there were some tubercle-like deposits. Bronchial glands were enlarged, one of them suppurating. The liver was somewhat waxy; presented some syphilitic cicatrices. The spleen was intensely waxy, and throughout its substance there were a number of small abscesses. The pus which they contained was normal, and presented no reaction with iodine. The abscesses were scattered throughout the substance. The capsule was thickened, but not of dense structure; it was adherent to neighbouring parts. The kidneys were atrophied, and intensely waxy, some of the tubes as well as all the arteries and Malpighian tufts presenting the ordinary reaction with iodine. Connected with the uterus was a number of fibrous tumours. The ovaries were fibrous. The intestinal canal was also in a state of waxy or amyloid degeneration; its villi and small vessels presenting the reaction very distinctly.

CASE XIII.—A. L., æt. 26, admitted 16th May 1864, to the Royal Infirmary, under the care of Professor Bennett. The patient was a sempstress, unmarried. She stated that she had been quite healthy until two years ago (May 1862), when she had acute rheumatism, and since then had never been well. Her feet and legs, and afterwards her abdomen, swelled, and she was obliged frequently to get up during the night to make water. On admission, the heart and lungs were normal, face swollen, skin pale. The urine was large in quantity, varying from 70 to 100 ounces daily, of low specific gravity, and of pale colour; it contained abundance of albumen, and some tubecasts. She also had severe diarrhœa, and occasional sickness and vomiting. The dropsy gradually increased, and she died exhausted on the 29th of June.

*Autopsy.*—The face and upper parts of the body were very œdematous. The abdomen was somewhat distended with fluid, and the legs pitted slightly on pressure. The heart was natural. The left pleural sac was obliterated by old adhesions, and in the right there was considerable effusion. The lungs



were congested and œdematous. The liver was connected with neighbouring parts by a number of old adhesions, and on its surface there were several cicatrices. The whole organ was fatty and waxy; the vessels exhibiting a distinct reaction with iodine. The cicatrices were composed of fibrous tissue, with numerous vessels in a state of waxy or amyloid degeneration. The spleen weighed 8 ounces. Some of its vessels and Malpighian bodies were waxy. The kidneys weighed  $5\frac{1}{2}$  ounces each, were fatty and waxy, granular on the surface; the cortical substance partially atrophied. Many of the tubules were filled with granular exudation, and the vessels and Malpighian bodies presented the appearance of the waxy degeneration and a marked reaction with iodine. Some of the smaller vessels were also fatty. The intestines were waxy throughout their whole extent, and presented no trace of ulceration. In the large intestine rings of pigmentary deposit surrounded many of the solitary follicles.

CASE XIV.—A. C., æt. 30, was admitted 30th May 1864, to the Royal Infirmary, under the care of Dr Sanders. The patient stated that she enjoyed good health till within four weeks of her admission, but for some months before had observed that she passed a larger quantity of urine than natural. She was obliged to get up several times during the night in order to micturate. She had a little dropsy, but it disappeared on the occurrence of diarrhœa a few weeks before admission. Her urine was pale, of specific gravity 1010, contained much albumen; was always upwards of 60 ounces daily, although she was affected at the same time with severe diarrhœa. She had frequent vomiting, and gradually became exhausted and died on 28th June. There was a distinct history of scrofula in her family. There was no positive evidence of syphilis, but she had the cachectic appearance, and complained much of pains in her bones.

*Autopsy.*—The body was somewhat emaciated. The heart and lungs were natural. Bronchi contained much muco-purulent fluid. The liver was large, weighed 4 lbs. 6 ounces; was bound to the diaphragm by numerous old adhesions. It was fatty and waxy throughout; both the vessels and cells were waxy. The spleen weighed 1 lb. 1 ounce; was intensely waxy. It was adherent to the diaphragm and neighbouring parts. The kidneys were both enlarged, the left weighing  $9\frac{1}{2}$  ounces, the right  $7\frac{1}{2}$  ounces. Both were intensely waxy. The vessels both in the cortical and conical substance, and the basement membranes of the tubes, presenting the amyloid reaction. In the right there were some tubercular-like masses, with corresponding cicatrices on the surface. The intestines were in a state of waxy degeneration. There was a small supernumerary spleen, which was also intensely waxy.

CASE XV.—A. F., æt. 22, a hawker, residing in Fountainbridge. She came under my care in March 1862, complaining of cough and œdema of her feet. I found that for three years she had had a cough, accompanied with expectoration and shortness of breath. Her chest gave signs of phthisis pulmonalis, but of a very chronic character. There was comparative dulness at the right apex; the respiration was indistinct, and accompanied by fine crepitation in the same region. The respiration at the left apex was clear, but the cardiac sounds were very distinctly propagated. The liver was enlarged, and extended across the epigastrium. Its vertical dulness in the mamillary line measured 5 inches. The spleen was not enlarged. The quantity of water was much above the normal, ranging from 80 to 130 oz. per diem. It was of a pale amber colour, slightly albuminous. No casts were found. The skin was dry; the appetite very fitful.

Since 1862 the patient has been under observation, and has sometimes improved in strength under tonic treatment, and at times suffered accessions of her disease. She has continued to pass large quantities of urine, which has at times been albuminous, at others not. She has also had hæmoptysis, and her chest symptoms are increasing in severity.

When she was lately an inmate of the Royal Infirmary, the following was her condition:—Skin pale; respiration harsh; slight dulness under right



clavicle; appetite irregular; urine about 105 oz. daily, of a pale yellow colour, specific gravity ranging from 1005 to 1012, of acid reaction, contained much albumen, much epithelium, and no sugar; no tubecasts were found. In this condition she continued when last seen.

CASE XVI.—Mr —, a gentleman of independent fortune, had, at about the age of 14, an abscess in the right side, near the hepatic region, but the source of which was not ascertained. He after this was healthy, vigorous, a keen sportsman; but at the age of 31 he began to complain of griping pains and severe diarrhoea. On examination it was found he was passing large quantities of urine. He was frequently obliged to get up during the night, in order to micturate. The urine was quite clear, very pale, of specific gravity 1008, containing albumen in considerable quantity. The casts were few, hyaline, with occasional fatty cells. The appetite was capricious; the stools were pale, and of an offensive odour. The liver was not enlarged. His symptoms gradually increased, and he died about the age of 32.

No autopsy was permitted; but his symptoms were so distinct as to incline me decidedly to reckon this a case of waxy degeneration of the kidney and intestine.

The following case illustrates the apparent curability of this degeneration. The patient exhibited all the symptoms of the degeneration of the organ, but these symptoms gradually disappeared:—

CASE XVII. Mr M., a gentleman, æt. 21, resident in Edinburgh, has been under my care for some months.

Some years ago he fell into a state of delicate health. His appetite became poor, and he became subject to occasional hæmorrhages, from the nose and other sources. His liver was greatly enlarged, extending downwards to the umbilicus; the quantity of urine increased to a marked extent, and was albuminous; his bowels were very irregular; and his general health much impaired. Under a course of iron, and of iodide of potassium, his general health improved, the liver diminished in size, and the urine became free of albumen. For about a year past no albumen has been observed; and his strength has become such as to enable him to resume his ordinary employment, and to work at it regularly during the past winter. The liver continues, even now, somewhat enlarged, and the cachectic appearance continues, but the urinary symptoms have very markedly improved.

The following case is of interest, as one possibly of amyloid degeneration of the kidneys, though the disease is not in the meantime distinctly defined:—

CASE XVIII.—W. L., a brassfounder, æt. 53, was admitted to the Royal Infirmary in March 1864, under the care of Dr Haldane. He states that he never had any venereal disease, excepting an attack of gonorrhoea, thirty years ago. He has been tolerably steady, but, while working in London, was accustomed to consume a good deal of beer. He noticed for some months past that he has been obliged to rise during the night to make water; and that if he was much confined his feet swelled slightly. In the end of February he vomited some clotted blood, and his stools were black.

On admission, he was anæmic; the skin and sclerotic slightly icteric; the eyelids were distinctly œdematous; the tongue was furred; the appetite poor; the bowels constipated. The liver was of normal size; the spleen measured 3 inches vertically, and  $4\frac{1}{2}$  inches across. The red corpuscles of the blood were pale and flabby, and the white were not increased in number. The heart and lungs were normal. The urine was, on the day following his admission, 50 oz., of specific gravity 1015; of a straw colour; acid reaction; contained a slight mucous cloud; otherwise normal. The following day, how-



ever, he made more water, about 100 oz., of specific gravity 1010; and he has continued ever since to pass that amount at least, every day. Albumen has not been observed. His general health has somewhat improved; but a lumbar pain has appeared, the œdema of the eyelids is undiminished, and his urinary symptoms continue. I mentioned in my former paper that I had anticipated in one case the appearance of the albumen in the urine, judging from the symptoms that an early stage of amyloid degeneration was present. It seems not improbable that in this case also we have the early symptoms, which may ere long develop themselves into something more important.

Having thus sketched the cases which I have recently observed, I shall now proceed to speak of each of the symptoms in succession, to indicate their importance.

*The Quantity of Urine.*—It will be observed that in all the cases I have mentioned, this is a prominent symptom. The increased quantity of urine being marked throughout the whole course of the disease; a diminution below the natural standard occurring only towards the end of the case, or under accidental influences. In many cases I have found that the patient was not aware of the increased flow of the urine, and only indicated it when he stated that he had to get up frequently during the night to make water, and that at each time he made a natural or excessive quantity; and thus I have found it necessary to ask them, not only whether they have observed that they made an excessive amount of water, but whether calls to micturition had disturbed them during the night.

The pathological anatomy of the disease seems to me to account very well for the changes in the amount of this secretion. The earliest manifestation of the degeneration is commonly in the transverse muscular fibres of the small arteries, and if these fibres are degenerated, it is reasonable to suppose that they are paralyzed, and so the regulating influence lost, and a congestion of the Malpighian bodies results. Unquestionably, when the degeneration has advanced, it diminishes the lumen of the arteries, and so must diminish the supply of blood; but other parts may act more vigorously, and more than compensate for the disadvantage. In the extreme stage a diminution actually does take place, and this perhaps coincidently, as I previously suggested, with exudation into the uriniferous tubules, as well as extreme degeneration of the arteries. This view, which I maintained on a former occasion, was opposed, on the ground that, in proportion as the degeneration of the arteries advanced, their calibre became diminished, and, as a necessary consequence, a smaller quantity of blood than natural could be transmitted to the vessels beyond; and if it were true that the watery part of the urine was mainly derived from the Malpighian tufts, it seemed very strange that the secretion should be increased, for it was precisely in the vessels forming these tufts that the degeneration was found most advanced; and it was maintained that the only way in which the increase of urine could be accounted for was by a reference to Virchow's and Beale's discoveries as to the circulation in the kidney. These observers show that a considerable quantity of blood passes



directly from the branches of the renal artery into the vasa recta of the medullary portion, and from thence into the capillaries, without passing into the cortical portion at all. From this it is evident that not only in the waxy degeneration, but in other forms of disease of the kidney, where there is an obstruction of the passage of blood through the vessels of the cortical portion, an increased collateral pressure would be exerted on the vessels of the medullary portion, from which, in consequence, an increased flow of watery urine would take place, and the whole quantity passed might be above, or, at least, not below the average. But the amount of blood sent directly to the medullary portion is very much less than that sent to the cortical substance, and no one can conceive that a shutting off of the latter from functional activity could be more than compensated by increased activity in the former. To say that a set of vessels, not amounting to more than one-fifth of another set, are capable of performing all their functions, seems to me extremely unsound, and, especially in this case, untenable, seeing that the vasa recta of the medullary portion are themselves very often the seat of this degeneration, and yet the polyuria is present. The explanation seems quite inapplicable to this form of disease. Besides, it is by no means proved that merely the amount of blood in a vessel bears relation to the amount of fluid transuding through its walls; the state of these walls themselves may probably influence these transudations in a manner and to a degree that we by no means understand. I do not wish to commit myself to any theory on this point, but it seems to me that the probabilities are more in favour of my explanation than of the other. An increase of thirst and of drinking cannot be regarded as the essential cause of the polyuria, seeing that in some cases I distinctly ascertained that the amount of urine was equal to, or even surpassed, the total amount of fluids consumed.

*Character of the Urine.*—The pale colour, and low specific gravity, and the presence of albumen, do not require special notice. The quantity of urea I hope soon to make the subject of special inquiry.

*The Tubecasts.*—In the amyloid degeneration we may meet with tubecasts of various kinds, the delicate transparent casts, which were formerly called waxy, and are now better termed hyaline; these hyaline casts with occasional epithelial cells in a state of fatty degeneration enclosed in their substance, others with a larger number of fatty cells, and occasionally finely or coarsely granular casts. Occasionally we see casts containing individual cells in a state of amyloid degeneration, and presenting its peculiar reaction. The occurrence of casts, such as these last mentioned, and which may be termed the amyloid casts, would of course establish the diagnosis of amyloid degeneration of the kidney; but none of the others afford any special evidence on one side or other, for they occur in all forms of Bright's disease. Thus, the hyaline casts constantly occur in the late stages of that degeneration which follows upon acute nephritis, and are thus evidently derived from uriniferous



tubules which have been denuded of epithelium. Those which contain a few cells in a state of fatty degeneration, and derived from tubules whose cells have in so far been destroyed, but in which some still remain, and those which present the granular appearance, are either composed of cells completely broken down, or of exudative matter in a state of incipient degeneration. If we trace a case of acute nephritis, we find in succession bloody and epithelial casts, granular casts, fatty casts, the amount of fatty cells gradually diminishing, and ultimately hyaline casts. In the waxy or amyloid degeneration we see the same casts, but appearing in the reversed order. Many varieties of conditions of the tubules exist in these cases of amyloid degeneration, and consequently we have a corresponding variety of casts. In the gouty kidney we also meet with the same forms; so that in no case can we positively conclude, unless where we have bloody or amyloid casts, as to the nature of the disease from their indications. It is true, that in the early stage of the amyloid degeneration hyaline casts prevail; but that, if unsupported by other evidence, cannot enable us to establish a diagnosis. Casts are formed by the coagulation of an exudation, or transudation poured out from the bloodvessels into tubules. This exudation, of course, encloses within it the epithelial or other elements which may be present within the tubes, and when the current of urine carries away the exudation, it, of course, carries also the enclosed matters. Thus, if it be poured out into a tubule denuded of epithelium, hyaline casts result; if into one full of cells, cell tubecasts result; if into one with a few cells, corresponding casts are formed. It is much to be regretted that the term "waxy casts" has so often been applied to the hyaline, for it has led many to imagine a relationship between these casts and waxy degeneration. The name is one which can only deceive, and should be abandoned.

*Dropsy.*—In some cases this symptom never appears at all; but, in the majority of instances, it occurs as a serious concomitant late in the disease, and in many at earlier stages. The patient complains that towards evening his boots become tight, though they fitted him comfortably in the morning. This state may continue for months, and only very gradually increase so as to become serious. Very commonly it first becomes severe in consequence of an intercurrent attack of acute nephritis. I do not think that it consists with the object of the present paper to enter into the causes or mechanism of dropsy; we shall therefore not say more on this topic.

*Diarrhœa.*—This is a very common, and frequently very serious symptom in cases of waxy degeneration. It appears to occur in all cases where the mucous membrane of the intestine has been affected. In the "Cellular Pathologie," Virchow speaks of the association of this symptom with the degeneration of the intestine as an established fact, and it will be observed that the cases I record confirm his observation.



*Temperature.*—I am indebted to my friend Mr Herbert Taylor for a few observations on the temperature of A. M., Case 1, from which it appears that a constant diminution by a few degrees existed, but much more extensive observation would be required to enable us to arrive at any general conclusion on this subject.

*The Cachexia, and the State of the Liver and the Blood.*—In many of the cases it will be observed a peculiar cachexia exists. There is a pale anæmic appearance, with occasionally a little dark pigmentary deposit in the skin, particularly about the eyelids, an air of general debility, and a pasty or waxy complexion. This would seem to be most commonly associated with the syphilitic forms. In other cases there is a characteristic appearance of the face with which I have become familiar, when the surface generally is pale and clear, but a very distinct congestion exists over both cheeks. This is not a congestion like a blush, but is seen by the naked eye to depend upon distention of narrow, small vessels, quite above the size of capillaries. These appearances, though interesting, do not seem to me important. But in many of the cases we have a distinct morbid condition of the blood, along with a slight increase of the colourless corpuscles. We observe that the red are soft and flabby, tending to tail, and form groups rather than rouleaux as do healthy corpuscles. This condition seems to depend upon affection of the spleen and lymphatic glands with the amyloid degeneration. In not a few instances the liver is found enlarged, sometimes to an immense extent, and whenever we find this condition, as well as those above indicated, we have a certain amount of evidence corroborative of the other more important symptoms.

*The Previous History* is often of great value in assisting us to arrive at a conclusion on the question of the nature of such cases. The fact has long been known that the amyloid degeneration is induced by long-continued wasting diseases, particularly syphilis, caries, and necrosis, and thus it is obvious that the fact of any of these having occurred in the previous history is in so far an evidence that the case of Bright's disease is one of this particular form. At the same time, it is by no means a constant occurrence that these maladies precede the degeneration, and they are therefore not to be looked for in every case.

*The Duration of the Disease* is evidently, from some of the instances recorded, very protracted. One of my cases (A. M.) has been under observation for upwards of four years, and though it was during that period that his albuminuria first appeared, we have no positive proof how long the polyuria had previously existed. The case also of E. B. was under observation for more than three years and a half, and when he first attracted my attention he had for some time been affected. The woman E. H., whose body was examined in June, had been under observation for four years, and had throughout presented the same characteristic symptoms. In many cases, then, it would appear to be very chronic, and I have not yet



seen a case from the very commencement of the renal symptoms to its fatal termination. The health of those who are suffering from the malady is never good; they are weakly, and have a great want of vital force, and are apparently very liable to other affections. They are subject to pains, aches, hæmorrhage; but on the whole do not suffer much from their degeneration, unless when it happens to occur in the intestine, when the wasting diarrhœa becomes a distressing symptom.

*The Modes of Termination of the Cases.*—A large majority, indeed almost all, seemed to pass on to a fatal termination; but from two cases, Nos. 15 and 17, I am inclined to think that it is not invariable. In both of these instances the albuminuria disappeared from the urine, and even the quantity of that fluid became diminished under the influence of tonics and good diet and regimen. In one of them this has gone on to what seems a complete recovery. In the other, relapse occurred so soon as she was deprived of the favourable surroundings in which she had been temporarily placed.

When it terminates fatally it would seem to lead to death in a variety of ways, most commonly by a disease superadded to the degeneration, sometimes an inflammatory affection of the kidneys, sometimes a disease of the bronchi, and sometimes from the ordinary concomitants, such as phthisis pulmonalis. In no case have I seen a patient die simply of the degeneration or its direct consequences; there seems to be always another disease superadded.

*Treatment.*—The cases which I have recorded render it perfectly evident that, under judicious treatment, the symptoms of this degeneration may be greatly ameliorated, and perhaps the degeneration itself cured. The rules which seem to me most important are, 1st, To attend to the nutrition of the patient, giving good nutritive food in the forms best suited to the individual tastes and powers of digestion; 2d, To give such tonic medicines as may improve the appetite; 3d, To give such hæmatic medicines as control the tendency to anæmia, and among these pre-eminently the syrup of the iodide of iron; 4th, In all cases in which a syphilitic infection has been traced, and even in many others, to give the iodide of potassium in moderate and sustained doses. The effects of these medicines are often very striking, and in particular the influence of iodide of potassium in diminishing the bulk of the liver is most remarkable. Again and again I have seen the size of the organ diminish under its use. In many cases all that we can do is of little or no avail, and the patient becomes worse and worse, and ultimately sinks.

Let us now glance at the amount of evidence we have collected. I have recorded in my two papers thirty-four cases, in all of which a certain series of symptoms was observed, which symptoms I associate with the waxy or amyloid degeneration of the kidney; one of the forms of Bright's disease. In nineteen of these cases a post-mortem examination has been made, and in all of them the

expected lesion has been found. In no case hitherto have I examined a body expecting the lesion and not found it. This evidence seems to me to prove that in many cases of the degeneration the symptoms are such as I describe, and are so distinct as to enable us positively to distinguish it from other forms of renal affection. But I by no means assert that I have absolutely established my views, and still less that I shall not likely require to modify them. I recommend the subject anew to the attention of the profession, anxious to test my observations by the general experience, and only recommending a very careful sifting both of the history and symptoms before a diagnosis is attempted.